Remarks

Claims 1, 33 and claim 35 have been amended and claim 36 has been added. Claims 1-36 remain in the application, and re-examination and reconsideration of the application are respectfully requested.

The systems of claims 1, 33 and 35 provide a reliable mechanism for sharing a resource (60 of Fig. 4) among a set of control programs 30 (Fig. 2) that are running on separate controllers, computers or PLCs 12, 20, 22. A communication system 24, for example, an Ethernet, has addressable locations providing communications capability with controllers 40, 42, control programs 30 and resource managers 32. The general purpose communications system 24 does not have a capability of providing mutual exclusion with respect to the resource 60. Therefore, resource managers 32 at different addressable locations on the general purpose communication system 24 communicate with each other and work together over the communication system 24 to arbitrate which one of a plurality of control programs 30 is given exclusive use of the resource. The resource can be abstract, physical or logical, for example, a physical workspace shared by two machines, and therefore, there is no requirement that the resource be connectable to, or controlled by, a computer. Dependent claims relate to systems that are capable of solving problems relating to deadlock and circular dependency for the control programs.

Claims 1-35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Reschef et al. (U.S. Patent No. 6,321,337) in view of DeKoning et al. (U.S. Patent No. 6,823,472). Reschef et al. relates to a system for protecting operations of trusted internal networks. More specifically, referring to Figs. 1a and 1b, the invention relates to a security gateway system 10 positioned between an external, untrusted computer environment 16, for example, the internet, and an internal, trusted computer environment 12. As described at column 4, lines 27-59, the security gateway system 10 includes independently-controlled complimentary computer processing entities that insulate the trusted environment from the untrusted environment. These entities are referred to as internal and external robots 24, 26, with the external robot 26 being

connected to the untrusted environment 16; and the internal robot 24 being connected to the trusted environment 12.

The robots 24, 26 can be implemented in two independent computers or reside within a single computer that is linked to both external and internal environments. The robots 24, 26 pass messages to each other over a dedicated communication link 28 using a transport protocol internal to the security unit. The external robot 26 converts messages received from the internet 16 into simplified messages by removing external environment transfer protocols and further reduces the content of the remaining messages to provide a simplified message. The internal robot 24 then converts the simplified message representation into one appropriate for use on the internal environment 12 by adding internal environment protocols suitable for use by applications operating on the internal computing environment. As noted in the Office Action, Reschef et al. does not teach a use of resource managers.

DeKoning et al. relates to a multiprocessor computer system for allocating use of shared resource memory by a shared resource manager. Referring to Fig. 1, multiple processors 102-106 are connected to an internal computer bus 112 that is also connected to multiple shared resource memories 108. Shared resource managers (SRMs) 110 are dedicated to respective ones of the shared resource memories 108 that are also connected to the bus 112. As described at col. 5, lines 9-20, in operation, the processors 102-106 via the bus 112 make allocation requests in the form of read and write operations to the SRMs 110 for access to the shared resource memories 108. Using standard bus arbitration features, the SRMs 110 coordinate, via arbitration of the bus 112, exclusive use of the shared resource memories 108 by the one of the processors 102-106. Thus, the shared resource managers 110 independently allocate and deallocate blocks of memory within the shared resource memory 108, but an inherent arbitration capability of the internal computer bus 112 determines the exclusive use of the shared resource memory 108 by processors 102-106.

In order to establish a prima facie case of obviousness, it is necessary that the Office Action present evidence, preferably in the form of some teaching, suggestion,

incentive or inference in the applied prior art or, in the form of generally available knowledge, that one having ordinary skill in the art would have been led to arrive at the claimed invention.

The following remarks relate to amended claims 1, 33 and 35. A prima facie case of obviousness is not made because Reschef et al. and DeKoning et al. do not teach the following elements recited in claims 1, 33 and 35.

First, claims 1, 33 and 35 require a communication system that has no inherent capability to provide mutually exclusive use of at least one resource. Thus, the communication system is fundamentally different from the internal computer bus 112 of DeKoning et al., which inherently includes a bus arbitration providing a mutual exclusion function.

Second, claims 1, 33 and 35 require a plurality of resource managers located at different addressable locations on the communication system. The "plurality of resource managers working together...to arbitrate which one control program...is given exclusive use of the at least one resource." Thus, the resource managers and not the communication system provide the mutual exclusion function. In contrast, in DeKoning et al., the shared resource managers 110 perform memory allocation and deallocation functions; but the internal bus 112, via a bus arbitration process, determines the mutually exclusive use of the shared resource memory 108 by the processors 102-106.

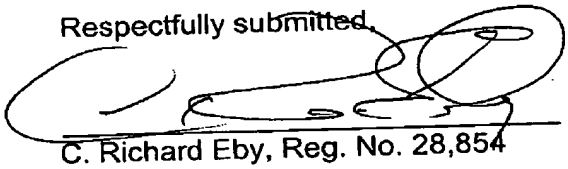
Third, claims 1, 33 and 35 require "each resource manager communicating over the communication system with at least one other resource manager" in a process to arbitrate exclusive use of the at least one shared resource by a control program. In contrast, in DeKoning et al., based on allocation requests in the form of read and write operations, the SRMs 110 only determine memory allocation and deallocation requirements for a dedicated resource memory 108. Thus, there is no requirement that one shared resource manager 110 communicate with another shared resource manager 110 over the bus 112. Further, Applicants have found nothing in DeKoning et al. indicating that the shared resource managers 110 communicate with each other over

bus 112; and therefore, Applicants submit that there is no teaching in DeKoning et al. of how cooperating resource managers might arbitrate exclusive use.

Applicants authorize the fee of $50 for one added claim to be charged to Deposit Account No. 23-3000. Applicants do not believe that any additional fees are due in connection with this submission. However, if such extension is due or any other fees are necessary, the Commissioner may consider this to be a request for such and charge any necessary fees to deposit account 23-3000.

Applicants respectfully submit that the application is now in condition for allowance and reconsideration of the application is respectfully requested. The Examiner is invited to contact the undersigned in order to resolve any outstanding issues and expedite the allowance of this application.

Respectfully submitted,



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